

Leak Detector Comprising an Inlet

PATENT CLAIMS

1. Leak detector (1) comprising: an inlet (2); a high-vacuum pump (3); a test gas detector (6), which is connected to the inlet of the high-vacuum pump (3); a backing pump (43), which is connected to the outlet area (21) of the high-vacuum pump (3), and a test gas line (47, 55) running between the inlet (2) of the leak detector (1) and the backing pump (43), which is connected to the outlet area (21) of the high-vacuum pump (3) via a line section (51), **wherein** the line (51) and the backing pump (43) are connected via separate connections (46, 22) to the outlet area (21) of the high-vacuum pump (3).
2. Leak detector in accordance with claim 1, **wherein** the outlet chamber (21) located within the housing (11) of the high-vacuum pump (3) forms the outlet area of the high-vacuum pump (3) and where the housing (11) is equipped with two separate connections (46, 22) which are connected to the outlet chamber (21).
3. Leak detector in accordance with claim 1 or 2, **wherein** the outlet chamber (21) is located in the vicinity of a chassis (20) of the pump (3).
4. Leak detector in accordance with claim 3, **wherein** the high-vacuum pump (3) is of a single flow design and where the inlet flange (4) and the chassis (20) oppose each other.
5. Leak detector in accordance with one of the claims 1 to 4, **wherein** the outlet chamber (21) has the shape of an annular channel.
6. Leak detector in accordance with one of the claims 1 to 5, **wherein** the high-vacuum pump (3) is designed by way of a turbomolecular vacuum pump.

7. Leak detector in accordance with claim 6, **wherein** the turbomolecular vacuum pump is equipped with at least one, preferably two further test gas inlets (38, respectively 45).

8. Leak detector in accordance with claim 7, **wherein** there is provided at the same level as the connection (45) a further connection (57) which is linked to the backing pump (43).

9. Leak detector in accordance with one of the claims 1 to 5, **wherein** the high-vacuum pump (3) is designed by way of a compound vacuum pump with a turbomolecular stage (18, 19) and a molecular pumping stage (9, 16).

10. Leak detector in accordance with claim 9, **wherein** at the level of the turbomolecular pumping stage (18, 19) a further test gas inlet (38) is provided.

11. Leak detector in accordance with claim 8 or 9, **wherein** at the level of the molecular pumping stage (9, 16), preferably at half the height of this stage, a further test gas connection (45) is provided.

12. Leak detector in accordance with claim 11, **wherein** at the same level as the connection (45), a further connection (57) is provided which is linked to the backing pump (43).

13. Leak detector in accordance with claim 10 or 11, **wherein** there is located at the level of the connection ports (45, 57) an annular channel (64).

14. Leak detector in accordance with one of the claims 9 to 13, **wherein** the molecular pumping stage is of a multi-stage design.

15. Leak detector in accordance with claim 14, **wherein** there is connected to a first molecular pumping stage (9, 16) with a pumping action axially in the direction of the chassis (20), a second molecular pumping stage (16, 70) which has an opposing direction of the pumping action so that the outlet area (21) of the high-vacuum pump (3) has a distance from the chassis (20) and is connected through an annular chamber (73) to the connection port (22) to which the backing pump (43) is connected and where also the connection port (46)²⁾ connected via the valve (54) with the test gas line (47) is connected to the annular chamber.

16. Leak detector in accordance with claim 15, **wherein** the outlet area (21) of the high-vacuum pump (3) is designed by way of a chamber substantially cylindrical in shape into which the second molecular pumping stage (16, 70) opens out and which is connected to the annular chamber (73).

17. Leak detector in accordance with claim 16, **wherein** there are present in the annular chamber (73) axially extending separating means, the position of which has been so selected that connecting channels separated from each other are present between the ports (46, 22) and the cylinder chamber (21).

18. Leak detector in accordance with one of the above claims, **wherein** connection ports (45, 57 respectively 46, 22) located at the same height are arranged with respect to the longitudinal axis of the pump on the side and form an angle ranging between 35° and 180°.

19. Leak detector in accordance with claim 18, **wherein** the connection ports oppose each other.

²⁾ **Translator's note:** The German text states "16" here whereas "46" would be more in line with the drawing figures and the remaining text. Therefore the "46" has been assumed for the translation.